

PROBLEM SOLVING



GRAPHING CALCULATOR You may wish to use a graphing calculator to complete the following Problem Solving exercises.

EXAMPLE 5

on p. 534
for Exs. 47–50

47. **CELL PHONES** You purchase a cell phone for \$125. The value of the cell phone decreases by about 20% annually. Write a function that models the value of the cell phone over time. Then find the value of the cell phone after 3 years. Round to the nearest dollar.

TEXAS @HomeTutor for problem solving help at classzone.com

48. **ANIMAL POPULATION** Scientists studied the population of a species of bat in some caves in Missouri from 1983 to 2003. In 1983, there were 141,200 bats living in the caves. That number decreased by about 11% annually until 2003.

- Identify the initial amount, the decay factor, and the decay rate.
- Write a function that models the number of bats since 1983. Then find the number of bats in 2003.

TEXAS @HomeTutor for problem solving help at classzone.com



49. **TAKS REASONING** In 2003 a family bought a boat for \$4000. The boat depreciates (loses value) at a rate of 7% annually. In 2006 a person offers to buy the boat for \$3000. Should the family sell the boat? *Explain.*

50. **MULTIPLE REPRESENTATIONS** There are a total of 128 teams at the start of a citywide 3-on-3 basketball tournament. Half of the teams are eliminated after each round.

- Writing a Model** Write a function for the number of teams left after x rounds.
- Making a Table** Make a table for the function using $x = 0, 1, 2, \dots, 7$.
- Drawing a Graph** Use the table in part (b) to graph the function. After which round are there 4 teams left in the tournament?

51. **GUITARS** The frets on a guitar are the small metal bars that divide the fingerboard. The distance d (in inches) between the nut and the first fret or any two consecutive frets can be modeled by the function $d = 1.516(0.9439)^f$ where f is the number of the fret farthest from the nut.



- Identify the decay factor and the decay rate for the model.
- What is the distance between the nut and the first fret?
- The distance between the 12th and 13th frets is about half the distance between the nut and the first fret. Use this fact to find the distance between the 12th and 13th frets. Use the model to verify your answer.